JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION- 2024
B.Tech 5th Semester (CE)

COURSE CODE (CREDITS): 18B11CE512 (3) MAX. MARKS: 35
COURSE NAME: Sewage Treatment and Disposal
COURSE INSTRUCTORS: Dr. Rishi Rana Kalia MAX. TIME: 2 Hour

Note: *(a) All questions are compulsory.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q. No	Question	CO	Marks
Q1	The populations of 5 decades from 1960 to 2000 are given below in table. Find out the population 2010, 2020 & 2035 beyond the last known decade. By (a) Arithmetic increase method (b) Geometrical method **Year**: 1960 | 1970 | 1980 | 1990 | 2000 **Population**: 25000 | 28000 | 34000 | 42000 | 47000	CO-1	**3 Marks**
Q2	(a) Define intakes. Explain any one of intake structure with neat sketch. (b) What do you understand by dry weather flow? Discuss in brief the various factors affecting the dry weather flow.	C0-2 C0-1&2	**2.5 Marks** **1.5 Marks**
Q3	(a) A main combined sewer is to be designed to serve an area of 12 sq.km with a population density of 250 persons/hectare. The average rate of sewage flow is 250 LPCD. The maximum flow of 100% in excess of average together with the rainfall equivalent of 15 mm in 24 hours, all of which are runoff Determine the capacity of the sewer. Taking the maximum velocity of flow as 3 m/sec., determine the size of the circular sewer. (b) Explain the working of conventional activated sludge process (ASP) with flow diagram?	C	**3 Marks** **2 Marks**
Q4	(a) Define activated sludge process with their operation including advantages and disadvantages. (b) The sewage flows from a primary settling tank to a standard trickling filter at a rate of 5 MLD having a 5-day BOD of 150 mg/L. Determine the depth and the volume of the filter, adopting a surface loading of 2500 l/m2 /day and an organic loading of 165 g/m3 /day.	C0-4 C0-3	**2 Marks** **4 Marks**
Q5	What do you understand by oxidation pond and explain the process of oxidation and stabilization?	C0-3& 4	**4 Marks**
Q6	(a) The 5 day BOD at 30° C of a sewage sample is 120mg/L. Calculate 5 days BOD at 20°C. Assume deoxygenating constant at 20°C, K = 0.1/day	C0-3	**3 Marks**

	(b) Discuss in detail the process of Deoxygenating and Reoxygenation with respect to self-purification of Natural water with a neat sketch.	C0-4	**2 Marks**
Q7	Given a waste water containing benzene 750 mg/l, calculate the COD. Also assume the value of k is 0.1 per day, compute ultimate BOD and 5 day BOD of the waste?	C0-2& 3	**2 Marks**
Q8	(a) What points should be considered before selecting the construction materials for sewer? Draw a neatly labeled diagram of egg shaped sewer system. (b) A 100 mL water aliquot was filtered through a dry GF/C filter paper of weight 2.2 g and filtrate collected in a crucible of weight 21.70 g. After oven drying at 104 °C for 24 hr, the resulting dried weight of filter was 2.275 g, while dried weight of crucible was 22.01 g. Assuming no weight loss of filter paper and crucible during heating, what would be the Total Suspended Solids (TSS) concentration in water? What would be the concentration of Total Dissolved Solids (TDS) in the water analyzed?	C0-1 C0-2	**1.5 Marks** **2.5 Marks**
Q9	The theoretical oxidation of Benzoic acid (C_6H_5COOH) takes as per the following reaction: $14CO_2 + 6H_2O$. For a wastewater containing 370 ppm of Benzoic- $2C_6H_5COOH + 15O_2$ acid, the estimated theoretical COD would be?	C0-2&3	**2 Marks**